

OPERATION OF THE PARTISOL-FRM R&P 2000 PM-10 SAMPLER

Purpose This Air Quality Group procedure describes the setup, calibration, maintenance and operation of the model 2000 PM-10 sampler manufactured by R & P.

Scope This procedure applies to the use

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Hazard Control Plan The hazard evaluation associated with this work is documented in Attachment 1: Initial risk = **low**. Residual risk = **low**. Work permits required: **none**. First authorization review date is one year from group leader signature below; subsequent authorizations are on file in group office.

Signatures
(continued on
next page)

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08/29/01

CONTROLLED DOCUMENT

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General information about this procedure

Attachments This procedure has the following attachments:

Number	Attachment Title	No. of pages
1	Hazard Control Plan	2

History of revision This table lists the revision history and effective dates of this procedure.

Revision	Date	Description of Changes
0	8/23/01	New document.

Who requires training to this procedure? The following personnel require training before implementing this procedure:

- Field workers sampling with the R & P Partisol-FRM Model 2000 PM-10

Training method The training method for this procedure is **on-the-job** training given by a previously trained individual and is documented in accordance with the procedure for training (ESH-17-024).

Annual retraining is required by **self-study (reading)** method.

Definitions specific to this procedure PM-10: The air monitoring instrument that collects solid airborne particles of 10 µm and less.

R & P: Rupprecht & Patashnick Company

References The following documents are referenced in this procedure:

- ESH-17-024, "Personnel Training"

Note Actions specified within this procedure, unless preceded with "should" or "may," are to be considered mandatory guidance (i.e., "shall").

Worker safety

Performing work safely

DO NOT perform work under conditions you consider unsafe. Before beginning work described in this procedure, review safety needs and requirements, identify hazards, and develop hazard mitigation measures. Be aware that facility configurations and hazards may change between visits. Hazards to assess include, but are not limited to the following:

Facility management units - Work control is the responsibility of the Facility Manager in whose area one may want to locate a sampler. Obtain approval from facility management before beginning work to locate a monitor in a Facility Management Unit. Facility management must also have knowledge of your presence and activity during subsequent normal operations. Ensure you have completed all facility-specific training requirements.

Loading and unloading the PM-10 monitor – Use caution when loading and unloading the PM-10 monitor; two people should be used.

Damaged electrical supply – if the conduit, extension cord, or the unit is damaged in such a way that electrical conductors may be exposed, do not touch the housing or unit. Call JCNNM or other appropriate authority to turn off the power.

Contact your supervisor and the project leader if working conditions are found to be unsafe.

Setting up the monitor

Monitoring site determination

Monitors may be used for a variety of applications. The **Air Quality Monitoring Project Leader** will determine the location depending on the purpose of data collection.

If possible, locate the monitor near a source of electrical power. In some cases, a qualified electrician or an electrical technician must be consulted for power hook-up or routing. If the sampler must be located where commercial power is not available, a generator may be used, but must be located downwind from the sampler. Always use a GFCI-protected outlet or a GFCI-protected extension cord.

Setting up and programming

To set up and program the monitor, perform the following steps:

Step	Action
1	After the location has been determined, use two people to take the sampler to the site and stabilize it by placing sandbags on its stand.
2	Plug into a GFCI-protected outlet.
3	Verify calibrations according to the chapter <i>Calibration Verification</i> .
4	Install a clean filter in the filter cassette and install the filter cassette into the filter exchange mechanism. Push forward on the handle of the filter exchange mechanism to raise the filter platform and enclose the filter cassette.
5	Turn sampler on and from the Main Screen be sure you are in the Stop Mode (press Run/Stop if necessary).
6	Press F5: Setup.
7	Confirm that the correct date, time (MST) and set flow rate are displayed on the Setup Screen. If not, reset by pressing F1:Edit and enter the correct data using the keypad and press Enter.
8	Press ESC to return to the Main Screen, then F1:Setup to enter the Filter Setup Screen.
9	Press F1:Edit, enter the sample run start time and start date, end time and end date and ID. Press Enter and ESC to return to the Main Screen.
10	Press Run/Stop. The sampler should enter the Wait Mode. Verify that the correct run data are displayed on the Main Screen.

Filter and data retrieval

Filter retrieval Ensure the sampler is in the Stop Mode before removing filter. Pull the handle of the filter exchange mechanism toward the front of the sampler. Remove the filter cassette and place in a transport container.

Check sampling run status If the elapsed time of the sample run is greater than 25 hours, a status code of “E” will be displayed. The majority of sample runs in ESH-17 will be greater than 25 hours and this code may be ignored. Note any other status codes.

Interval data The sampler writes a new record of interval data every 5 minutes (5-minute averaged temperatures, pressures and flows). It has a capacity of 2 weeks, at which time the oldest data are overwritten by the newest data. Therefore, if a sampler runs for 2 weeks, it is important to retrieve the data before it starts to overwrite.

Record filter data To record filter data, press F3: Data; record in logbook or download as described below.

Downloading data onto a laptop To download data onto a laptop, perform the following steps:

Step	Action
1	Use a laptop loaded with RP Comm software. Connect the laptop to the sampler with a 9 pin to 9 pin RS232 connector cable.
2	Enter the Filter Data Screen on the sampler.
3	Open the RP Comm program on the laptop and click on the “new connection” icon (piece of paper with a bent corner).
4	Connection Type is “2000 FRM”.
5	Click on “connect to selected instrument” icon (hung up telephone).
6	Click on “select all data” icon (empty circle).
7	Click on “interval data” tab.
8	Click on “download data” tab.
9	Click on “download all selected data” icon (chevron).
10	In a few moments the data will begin to download. When the download is complete, select all of the data (click on date, shift and click on each column) then click on the disk icon to save. “Save filter data” appears first. Save it as text. “Save interval data” appears next. Name it.
11	Open Excel and save data as an Excel file.

Calibration verification

When to calibrate

The calibration of the R & P PM-10 monitor should be checked every 3 months of routine operation and whenever the sampler is relocated.

Equipment needed to verify calibration

To verify calibration, the following equipment is needed:

- calibrated thermometer
- calibrated barometer
- clean 47 mm filter of the material to be used during data collection
- flow audit adapter
- Buck calibrator
- logbook

Steps to calibrate the PM-10

To verify calibration of the R & P PM-10, perform the following steps:

Step	Action
1	Turn on the sampler. It must be in Stop Mode in the Main Screen to perform the verification audits.
2	To verify Ambient Temperature, press F5: Setup and then F5: Audit. Determine the current ambient temperature in degrees C using the calibrated thermometer. Verify that the value for the temperature displayed by the Partisol-FRM in the Audit Screen is within $\pm 2^{\circ}\text{C}$ of the measured temperature.
3	To verify the Filter Temperature, measure the temperature at the location of the filter in the sampler using the calibrated thermometer. Verify that the value for the temperature displayed by the Partisol-FRM in the Audit Screen is within $\pm 2^{\circ}\text{C}$ of the measured temperature.
4	To verify the Sampler Ambient Pressure, measure the ambient pressure at the sampler in mm Hg using the calibrated barometer. Verify that the value for the ambient pressure displayed by the Partisol-FRM in the Audit Screen is within ± 10 mm Hg of the measured pressure.
5	To verify Sampler Flow, remove 1 st stage inlet and replace with the Flow Audit Adapter, valve open. Attach the Buck calibrator to the Flow Audit Adapter. Install the clean 47 mm filter. Press F3: Pump and then F2: Valve. Using the Buck, determine the flow in l/min (average 5-10 Buck readings). Verify that the displayed flow in the Flow Rate field of the Audit screen is within $\pm 5\%$ of the actual flow.
6	Return to the Main Screen by pressing ESC twice.

Steps continued on next page.

Calibration verification, continued

Step	Action
7	Reinstall the 1 st stage inlet and discard the filter used for calibration verification.
8	Record results in logbook.
9	If any of the readings are outside the accepted range, consult the Partisol-FRM 2000 service manual to perform further calibration tests.

Sending filter for analysis Preweighed filters may be mailed to the State Health Department Scientific Laboratory Division, 700 Camino de Salud, Albuquerque, NM, 87106 for final weights. If rad analyses are to be performed, follow directions of project leader.

Maintaining the PM-10

Clean filter cassettes Inspect and clean filter cassettes with a clean dry cloth after every use.

Steps to clean 1st stage inlet Clean the 1st stage inlet after every 2-8 weeks of inlet usage, as needed, by performing the following steps:

Step	Action
1	Remove sampler inlet by lifting off the inlet tube.
2	Unscrew the top acceleration assembly from the lower collector assembly.
3	Mark the top plate deflector cone and lower plate to indicate proper orientation for easier reassembly after cleaning and maintenance.
4	With a philips screwdriver, remove the four pan head screws from the top of the top plate, and lift the top plate off the four threaded spacers.
5	Lift the insect screen off the lower plate rain deflector and clean with a soft brush or rinse with water. Dry and reinstall.
6	With a general purpose cleaner (eg. Fantastik) and paper towel, clean the top plate deflector cone and internal wall surface of the acceleration assembly.
7	Clean the acceleration nozzle with a cotton swab and general purpose cleaner.
8	On the lower collector assembly, clean the walls and bottom with cleaner and paper towels. The 3 vent tubes may be cleaned with cotton swabs.
9	With a cotton swab, clean the weep hole in the collector plate where the moisture runs into the moisture trap. Remove the rain jar and clean if needed. Inspect the brass fitting to ensure tightness and non-blockage. Place a light coat of silicone grease on the gasket inside the cap of the rain jar and reinstall.
10	Inspect the 2 inlet o-rings for wear. Coat lightly with silicone grease.
11	Reassemble.

In-line filter Replace the large in-line filter every 6 months of operation. Turn off the sampler to replace the filter.

Air screens Clean the air screens located under the sampler's rain hoods every 6 months of operation.

Maintaining the PM-10, continued

Pump maintenance

The pump has a lifetime of approximately 2 years. It may be rebuilt using the Partisol Pump Rebuild Kit or replaced with a new pump.

Battery voltage

Check the voltage level of the batteries on the main computer board every 6 months. Measure the voltage across the ground (GND) test point in the center of the interface board and the top surface of the round battery on the computer board. The voltage should be at least 2.5 VDC.

Records resulting from this procedure

Records

The following records generated as a result of this procedure are to be submitted as records to the records coordinator annually:

- Entries in the R & P Partisol-FRM Model 2000 PM-10 Logbook (this logbook will be maintained and submitted according to ESH-17-011)
- Downloaded data

HAZARD CONTROL PLAN

1. The work to be performed is described in this procedure.

“Operation of the Partisol-FRM 2000 PM-10 Sampler”

2. Describe potential hazards associated with the work (use continuation page if needed).

Falls/tripping --

Handling heavy objects (loading/unloading/transporting/postioning)--

Cuts/smashed fingers from handling bulky instrument.

Animal Injuries- (snakes, spiders, mountain lions, etc.)

Weather, lightning

High Explosives testing (as needed)

Radiation Areas (as needed)

Electrical shock in wet conditions

Electrical shock from damaged electrical components via vehicle or animal damage.

3. For each hazard, list the likelihood and severity, and the resulting initial risk level (before any work controls are applied, as determined according to LIR300-00-01.0, section 7.2)

Falls/tripping --Moderate/Occassional = Minimal

Handling heavy objects (loading/unloading/transporting/postioning)--Moderate/Improbable = Minimal

Cuts/smashed fingers from handling bulky intrument -- Moderate/Improbable = Minimal

Animal Injuries (snakes, spiders, mountain lions, etc.) -- Critical/Remote = Minimal

Weather, lightning -- Catastrophic/Remote = Low

High Explosives testing (as needed) – Critical/Remote = Minimal

Radiation Areas (as needed) -- Negligible/Remote = Low

Electrical shock in wet conditions -- Catastrophic/Remote = Low

Electrical shock from damaged electrical components via vehicle or animal damage — Critical
/Improbable= Low

Overall *initial* risk: ☐ Minimal ☒ Low ☐ Medium ☐ High

4. Applicable Laboratory, facility, or activity operational requirements directly related to the work:

☐ None ☒ List:

Work Permits required? ☒ No ☐ List:

LIR 402-7-6-01 "Personnel Dosimetry"

LIR 402-718-01 "Radiological Training"

Access Control Requirements for applicable areas or FMUs

29 CFR 1926.500, Subpart M, Section 502, "Fall protection"

National Fire Protection Code--for use of electrical GFCIs.

LIR 402-600-01.0 "Electrical Safety" for all electrical hazards.

HAZARD CONTROL PLAN, continued

5. Describe how the hazards listed above will be mitigated (e.g., safety equipment, administrative controls, etc.):

Falls/tripping -- "Employee Orientation" includes training and awareness of trips, slips, and falls.

Handling heavy objects (loading/unloading/transporting/postioning) -- Use proper lifting techniques.

Two people are highly recommended when moving the sampler.

Cuts/smashed fingers from handling bulky instrument -- Use due caution.

Animal Injuries -- "Employee Orientation" includes training and awareness.

Weather (lightning) -- "Employee Orientation" includes training and awareness. Use lightning detection portable instrument when threatened and seek shelter.

Entry into High Explosives testing areas -- existing controls are stringent and not easily bypassed.

Existing facility controls include site specific training, sign-in/sign-out, and scheduling procedures.

Entry into posted Radiation/Controlled Areas -- Example: TA-54-Area-G and TA-15 controls are stringent and not easily bypassed -- Area-G and TA-15 require entry through manned access control gates. Electrical shock in wet conditions -- Must use extension cords with GFCI for every use.

Electrical shock from damaged electrical conduit -- the administrative control requires that JCNNM be contacted to shut power off prior to any further work. Do not approach the unit if there is any obvious damage and where there could be a potential for electrical shock.

6. Knowledge, skills, abilities, and training necessary to safely perform this work (check one or both):



Group-level orientation (per ESH-17-032) and training to this procedure.



Other → See training prerequisites on procedure page 3. Any additional describe here:

7. Any wastes and/or residual materials? (check one) ☒ None ☐ List:

8. Considering the administrative and engineering controls to be used, the *residual* risk level (as determined according to LIR300-00-01.0, section 7.3.3) is (check one):



Minimal



Low



Medium (requires approval by Division Director)

9. Emergency actions to take in event of control failures or abnormal operation (check one):



None



List:

For all trips, falls, cuts/smashed fingers, electrical shocks, and animal injuries, provide first aid and see that injured person is taken to ESH-2 or the hospital. For any exposed, energized electrical wires, contact JCNNM or the appropriate authority to turn power off. Follow all site-specific emergency plans for any radiation or explosives emergencies.

Signature of preparer of this HCP: This HCP was prepared by a knowledgeable individual and reviewed in accordance with requirements in LIR 300-00-01 and LIR 300-00-02.

Preparer(s) signature(s)

Name(s) (print)

/Position

Date

Signature by group leader on procedure title page signifies authorization to perform work for personnel properly trained to this procedure. This authorization will be renewed annually and documented in ESH-17 records.

Controlled copies are considered authorized. Work will be performed to controlled copies only. This plan and procedure will be revised according to ESH-17-022 and distributed according to ESH-17-030.